Southern Resident killer whales: from captivity to conservation

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The Legacy of Captivity
Between 1962 and 1977, at least 275 (up to 307) killer whales were captured in the waters of Washington State and British Columbia. At least 47 individual SRKWs were sold to marine parks or died during the capture effort—approximately 42% of their population. Juveniles were disproportionately targeted, effectively removing an entire generation. From an estimated historic size of more than 500 whales, the SRKWs had just 70 individuals in 1974.

The Rise of Modern Threats
While capture efforts directly decreased the SRKW population, new threats to their survival emerged. The cumulative impact of these threats causes a negative feedback loop, further impeding recovery and increasing stress. A lack of prey causes individuals to metabolize faster, releasing stored contaminants and compromising reproductive and immune systems. Research indicates that about 69% of detected contaminants and compromising reproductive and immune functions.

The Salmon Issue
- Chinook salmon have declined dramatically throughout the Pacific Northwest. The major river systems utilized by the SRKWs include the Fraser, Puget Sound, Columbia/Snake, Klamath, and Central Valley.
- Salmon have been decimated by the four Hs: hydrography, harvest, hatchery, and hatchery effects. DAMs have a significant impact on salmon populations by blocking migration routes, degrading habitat, and altering the flow of rivers.
- British Columbia salmon stocks are estimated to be 5% of their historic size; Puget Sound stocks are 5% of Columbia River.

The Orca Salmon Alliance
- A cross-cutting coalition of scientists and advocacy groups working together to address the decline of SRKWs and salmon in the PuRM by protecting the entire ecosystem.
- Focuses on the interactions and connections between ecosystem elements and offers a new perspective on conservation issues.
- Encourages new partnerships and collaborative efforts between multiple sectors, advocates, managers, and policy-makers.
- Works to increase knowledge and improve communication about the source of threats and new innovative opportunities for involvement.
- Creates public knowledge and engagement to influence policy.

Southern Resident Killer Whales
- Range: Central California to Southeast Alaska; Salish Sea
- Diet: 3% plant matter, predominantly Chinook salmon (73.5% of summer diet)
- Status: critically endangered
- Threats: Prey depletion, toxic contamination, vessel effects (noise and harassment), oil spills, small population size (disease and inbreeding)

Research: As of October 1st, 2017: 76 individuals remaining
- J pod: 23, K pod: 18, L pod: 35

Ecosystem-based Recovery
Ecosystems are complex, and recovery requires a holistic approach based in environmental science, with coordination and partnerships between agencies and sectors, public education and involvement, connections between science and policy, and adaptive management. Isolated, single-issue ways of doing business and treatment ecosystem-based management.

Endangered Species Act: "The purposes of this Act are to provide a means of insuring the survival of threatened species and protected species..." (ESA section 2(b))

Marine Mammal Protection Act: "...efforts should be made to protect essential habitats..." (MMPA section 3(2))

US Commission of Ocean Policy: "A comprehensive and coordinated national ocean policy requires moving away from the current fragmented, single-issue way of doing business and toward ecosystem-based management..."

Southern Resident killer whale population count by year
(From: Whale and Dolphin Conservation)

Ecosystem approach to endangered species recovery:
- Recognize and address cumulative impacts.
- Research indicates that restoring predator and prey species together is almost always more efficient than sequential recovery. The sequence of restoration matters when one target is eaten by another. "Size- and/or food-based approaches may be the root of predator-first approaches in which specialist predators do not have access to a readily available and abundant prey base." (Smolen et al. 2017)
- Habitat restoration benefits salmon and helps to reduce toxin loads.
- Critical habitat designation creates the "umbrella effect" of additional protection for important prey species.

Ecosystem recovery is necessary to ensure long-term survival of the SRKWs, but their decline and critical status requires EBM to be paired with short-term, immediate impact actions.

Immediate measures to improve salmon survival (spill, floodgates, rainwater harvesting, and controlled toxic discharges)
- Interagency and transboundary cooperation to address salmon, habitat, and pollution:
  - Apply research to develop concrete actions through adaptive management.
  - Expand critical habitat and identify essential habitat features.
  - Establishing and protecting source point source pollution.
  - Develop and enact measurable, ecologically relevant noise reduction goals.

References